THE Chemist

OCTOBER, 1944 VOLUME XXI, No. 7

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War Developments in Glass

T. J. Thompson

Corning Glass Works.

Presented before THE AMERICAN INSTITUTE OF CHEMISTS, *New York, N.Y.*

THERE has been a great deal of curiosity about glass during the last two or three years. Most of the questions during the early stages of the war emergency were prompted by frantic efforts to find workable substitutes for metals or other critically short materials of construction and it was not unduly difficult to answer those questions. Later on, as the war progressed, the armed service and their agencies began asking some pointed questions about the possibilities of using glass in weapons, ammunition, and other specialized military applications.

All of these questions revealed an astonishing lack of information about glass among technical men who otherwise are well versed in the ins and outs of metals, alloys, plastics, and wood. While discussing some of the new developments, I shall attempt to throw some light on some of the less commonly understood properties of glass.

The Strength of Glass

By far the most frequently asked questions concern strength. "How strong is glass in tension ", "How strong is it in shear?", "How strong is it in compression?" We can answer the last one quickly by making the generalization that "glass never fails in compression." Like all generalizations, there are exceptions to that one too. Here, is a little ball for use in ball bearings. Three of those were mounted in a test fixture, one on top of the other, and a load applied until rupture occurred. The calculated compressive stress at break was 820,000 p.s.i. The main point is that glass is so much stronger in compression than in tension that for most applications it is safe to say that it never fails in compression. It is wise to design glass parts so that the major strain is compressive whenever this can be done.

The answers to questions on tensile strength are not so simple. The shape and size of the piece become important factors not only in determining the loads it can bear in the common or annealed state, but size and shape also determine whether or how much the glass can be reinforced or strengthened by heat-treating or other processes. Nevertheless, there are a few fundamental guideposts which aid greatly in

understanding and designing glass.

Let us first consider annealed glass, glass which has been heat-treated after forming to relieve essentially all of the internal strain. In that state, it has an ultimate tensile or flexural strength ranging upwards to 15,000 lbs. per square inch or more. In some large pieces, minimum breakage is encountered at sustained stresses computed to be as low as 2500 p.s.i. but for most ware 6000 p.s.i. is apt to be the minimum break. Because of the impossibility of accurately computing the local stresses in a piece of glass in use, it is necessary to apply large factors of safety in designing parts stressed in service. Consequently, we usually limit the maximum working tensile stress to 1000 p.s.i. in annealed ware. If it were possible to melt and fabricate glass so that it were entirely free from internal flaws such as bubbles, stones, cords etc. and then prevent the surface from being scuffed or scratched and otherwise marred, it would be possible to use glass at very much higher stresses. Actually, glass has enormous intrinsic strength, measurable in millions of pounds per square inch, but the only form in which glass has ever been made to have such strength is fiber. Freshly drawn fiber actually demonstrated strength of over 2,000,000 p.s.i. Unfortunately, it doesn't retain it long. Merely rubbing the finger along the fiber causes the strength to drop considerably. Why? We don't quite know yet, but we are are trying to find out.

A great deal of the strength of glass in the annealed state depends on the condition of the surface; that is, whether it is scratched or bruised, or rough ground or fire polished. In fact, most glass physicists agree that attempts to measure the tensile strength of glass result only in a measurement of the condition of the surface of the individual piece being tested. But, since it is only natural to expect glass to be abused in service, it is necessary to take this into account in establishing maximum permitted tension for design work.

Obviously, the bigger a piece of glassware, the greater is the probability that a flaw or bruise will occur at points of stress concentration such as corners or holes, etc. It therefore becomes necessary when designing large pieces to minimize stress concentration by such means as eliminating sharp corners, or increasing the section thickness, or to reduce the permissible working stress.

Here is a simple but interesting example of good design which eliminates dangerous stress concentration and permits high loading. These are a standard 2" piping elbow and tee. Such equipment is now widely used in the chemical and food processing industries at internal pressure up to 100 p.s.i. Sometimes it's necessary to use gaskets of very hard composition to withstand certain mixtures of hot

acids and solvents. Therefore, it is necessary to apply considerable bolt tension to compress the gasket enough to make a tight joint against such line pressures and that, in turn, creates a stress problem in the glass. Yet, with this design it is possible to tighten the bolts until they break without incorporating excessive strain in the glass, because the tapered construction throws the glass into compression and the use of a hard asbestos insert between the metal flange and the glass cone prevents metal-to-glass contact and point-loading or stress concentration.

Among the diversified applications of glass piping are those in the chemical and food industries, such as beaded piping, which can be cut to length in the field, then "beaded" and annealed by ordinary workmen. Electrically sealed piping has its joints sealed "in-place," with no gaskets or metal joint hardware.

Another example of how glass can be designed to withstand enormously high stresses is glass jewel-bearings. They were developed during the war as a substitute for sapphire bearings which were no longer procurable in the desired quantities. Their principal field of application has been for aircraft instruments. A small, hardened steel pivot rests in the V-cavity and since the bearing-radius is only .001 inch a load measured in ounces results in local stresses of hundreds of thousands of pounds per square inch when a plane comes out of a power dive or lands. A specially hard glass composition is used in these bearings, and the manufacturers of instruments have found them so durable that they expect continued wide-scale use after the war. Since the jewels are formed by moulding instead of cutting and polishing, they are considerably cheaper.

Now, what about strengthened glass? Unless you are in the glass business, you are probably just a little puzzled as to just what it is and what can be expected of it. It is interesting to demonstrate the difference in strength of annealed and strengthened glass. Here are two small rods which are identical in all respects except one. One rod is processed to increase its strength, and the other is annealed. With this file, I severely scratch this one and then bend it. It breaks easily. Here is its twin which I shall treat in the same way and, it is almost impossible to break it with the hands alone. Obviously, it is much stronger. It was made that strong by special heat processing. The principal improvement obtainable in glass by such strengthening methods is much greater flexural strength. But, actually, there is also an appreciable improvement in resistance to pure tension because the surface has been strengthened against the weakening effects of surface flaws, scratches and bruises.

"How much can glass be strength-

ened?" The answer to that depends on three factors—shape, size and glass composition,—but, in general, two to four times the annealed strength is thus obtainable, always providing that the piece is of such design and shape that it can be tempered economically. There are some shapes which cannot be satisfactorily strengthened, because of inaccessibility of certain zones which make it difficult or impractical suddenly to cool all surfaces at the same split second. Such a shape is a narrow-neck bottle, the inside surfaces of which cannot be quickly cooled.

Some examples of glass strengthened by tempering are: (Safe) sight glass for high pressures; reflex gauge glass; diamond power glass, (2200 p.s.i.) for high pressure steam boilers; Pyrex coffee percolator; double tuff tumbler; army dinner ware, and spring. The latter four have good impact resistance.

Another peculiarity of glass is that it can be made to have very closely controlled ultimate strength. In some instances, devices such as safety exhaust plates can be made to break at plus or minus ten per cent of a predetermined load. And the strength of glass remains nearly constant over a very wide temperature range.

The ability of glass to shatter instantly and completely is sometimes very useful. In fact, there is a growing number of applications for "strong weak-glass"; i.e. glass which is strong enough to carry a certain load yet will break completely and positively when called upon to do so; for example, glass elbows of the type used to connect the gasoline and air lines to jettisonable gas tanks on fighter planes. Here premature failure would be as disastrous as excessive strength.

Precision Finished Glassware

One of the most significant wartime developments in glass is the rapidly expanding knowledge of how to form or finish glass parts to very precise tolerances. Examples in which this has been achieved are: Sealed beam headlight, with moulded parabolic reflector of great accuracy; Nash pump, finished by grinding to tolerances as close as those of conventional metal pumps; G. E. coffee maker, with fully automatic operation attained through accurately formed and finished glass parts; precision bore tubes, chamber gages, and rotometer tubes with internal contour and dimensions held to close limits (.0001") without grinding; ring and plug and snap gages, accurately finished by grinding to tolerances as low as class X gauge specifications (.00002"); ground-joint coffee maker wherein the flat ground joint holds required vacuum and eliminates rubber gasket; glass jewel-bearings which replace sapphire. (The moulded surface is as accurate and smoother than gems. The impact and compressive strength is as great as that of the steel pivots

which rest in them. These are used mostly in electrical installation in planes but will probably replace sapphire for many peacetime applications, such as in watches, clocks, precision instruments.

Laboratory Glassware

In laboratory glassware, there have been some notable new developments along with continued improvement and refinement of the older types.

Fritted Ware

Porous fritted discs, made by methods similar to those used in powder-metallurgy have been incorporated into numerous types of apparatus where controlled porosity is an important consideration, such as gas-washing bottles, extraction thimbles, filters, Buchner funnels, gas-dispersion tubes etc. There are now five grades of porosity including a new ultra-fine, having pore size of 1.8″ and a new extra-coarse grade with pore size of 120 microns, particularly suitable for sulfur determination in petroleum chemistry. The pressure required to force air thru these discs ranges from 9 p.s.i. for the ultra-fine to about 1 p.s.i. for the extra-coarse.

Low-actinic Ware

A rather complete line of low-actinic ware called "Lifetime Red" is now available for use with light-sensitive compounds. Its transmission of all actinic radiation up to 3000 Å is zero and only 12 per cent at 6000 Å.

Alkali-Resistant Ware (Boron Free)

Another rather complete line of ware is now available, made from a specially formulated glass free from boron. Its resistance to alkalies is about ten times as great as regular Pyrex Laboratory Ware and it is therefore particularly suitable for work involving strongly alkaline solutions, and boron determinations.

Ball-and-Socket Joints

Increasing knowledge of the art and technique of precision-finishing of glassware has made possible the development of a new line of ball-and-socket joints. It will shortly be available in sizes ranging from 1 to 40 mm. I.D.

Miscellaneous Laboratory Ware

Other interesting new ware is: (1) Corad head for distilling apparatus, which permits selection of reflux ratio thru the range between 1.5 to 1 and 30 to 1 without guess-work or tedious manipulation of stopcocks. (2) Improved graduated cylinders and hydrometer jars having moulded hex base to prevent rolling and with a reinforced top rim which makes them many times stronger than the old style. The pouring spout of the graduates is positioned with respect to the hex base so that it cannot receive a direct blow should the graduate be knocked over.

(3) *Syringes for Ampoule Filling.* Accurately finished syringe barrels and plungers are now available in standard sizes for metering solutions into ampoules.

(4) Penicillin culture flasks, or

Roux bottles are now being made by machine and so are special Blood Bank centrifuge bottles having specially strengthened bottom construction.

Ninety-six per cent Silica Glass

One of the major developments in glass just before the war was "reconstructed glass," more familiarly known by its "Vycor" trade-mark, which starts out as a conventional glass composition which can be moulded or pressed or drawn with normal glass working methods and equipment. Then the ware is converted to a 96 per cent silica composition, similar to quartz, by a unique combination of processes involving heat treatment, acid leaching and subsequent firing. In addition to a rather extensive line of laboratory ware, this new glass has been put to a number of interesting industrial uses such as thermo couple protector tubes for high temperature furnaces where the atmosphere is highly corrosive, and for vessels in which sensitive chemicals are calcined at high temperatures.

Ninety-six per cent silica glass has also been made available in another form which is opaque; it is called Multiform glass because of the relative ease with which intricate shapes can be made from it by methods similar to those used in manufacture of porcelain or other ceramic ware. A huge variety of electrical parts used largely in military radio equipment has been made. Glass buttons are superior to the ocean pearl buttons they are intended to replace; they do not lose their luster after repeated laundering and they have no sharp edges to cut the thread.

Ninety-six per cent Silica glass is available in still a third form. The initial glass composition is given a long, soaking heat treatment which results in a separation into two phases, both of which are glassy and may be considered as continuous. One of these phases is largely silica and therefore insoluble in acid; but the other is quite soluble and is readily leached out, thus leaving a porous silica sponge having enormous surface area and a void space of approximately 35 per cent. Specifically, certain samples have been reported by Emmett to have surface area of 127 sq. meters per gm. which is equivalent to the floor area in a room 25 ft. wide by 47 ft. long. By variations in processing, this surface area can be increased to approximately 200 sq. m. per gm. The pores are oriented in a direction normal to the surface being leached; pore radius is between 30 and 60 Å.

Such large surface area is not in itself particularly outstanding because other materials such as silica gel, activated carbon and activated alumina have even more. The most significant fact about porous glass is that it can be produced in various structural shapes such as cylinders, rods, strips, sheets, vessels etc., all of which have

mechanical strength not greatly below that of ordinary annealed glass. In addition to the usual forms such as pellets or granules, it can also be produced in the form of fiber. All these properties suggest possible uses such as catalysts, catalyst carriers, adsorbents, semi-permeable membranes and ultra-filters.

Metal-Glass Combinations

Firm attachment of glass to metal has always been difficult because of the widely different characteristics of these two materials of construction, but great strides have been made during recent years in solving this problem.

A simple but highly effective technique which has proved to be very useful is the use of some of the softer metal alloys to make strong mechanically locked assemblies of glass and steel parts, such as in Suspension Insulator, Godet Wheels, Roller, and Pump Impeller.

Another development is metalizing of the glass; that is, depositing a coating on the glass which permits direct attachment to metal by simple soldering technique.

An interesting forerunner of metalized ware is a metalized glass index window for household gas meters. It has made possible a permanent, cheap, gas-tight, and gasketless sight glass in the tinned metal housing. The strength of the bond is as great or greater than the strength of the glass itself. Such metalized windows are now used widely.

Further refinements and improvements have been made in the metalizing technique and the field of industrial application has broadened immensely, particularly in the manufacture of radio equipment where the electrical properties of glass are important.

A new development which is still in the experimental stage is the use of zinc die-casting in conjunction with glass parts, for example, a glass plug with which zinc has been die-cast to make a strong, vapor-tight joint.

Optical Glass

In optical glass, enormous strides have been made in melting, refining, moulding and large-scale production. The story on this cannot be told now, but it is comforting to know that never again does this country ever have to depend on outside sources of supply for its optical glass requirements in war or peace.

Sahyun Vice-President of Stearns

Melville Sahyun, F.A.I.C., director of research of the Frederick Stearns division of Sterling Drug Company has been elected vice-president of the division. Dr. Sahyun has been associated with Stearns since 1934, and is a pioneer in work on insulin and amino acids.

Conant Honored

James Bryant Conant, president of Harvard University, who received the Gold Medal award of THE AMERICAN INSTITUTE OF CHEMISTS in 1934, was awarded the Priestley Medal of The American Chemical Society at its New York Convention held September 11th to 15th.

Bernard M. Baruch, speaking at the Society's dinner on September 13th, credited Dr. Conant and Dr. Carl T. Compton for the work upon which the Baruch report on the rubber situation was based, "The very methods which Dr. Conant recommended," according to Mr. Baruch, "proved in the circumstances to be the best, the most feasible, and solved the problem of the critical rubber shortage."

Mr. Baruch expressed the hope that as a nation we would take advantage of the education and abilities of our scientists to solve other pressing social and economic problems.

Universal Oil to American Chemical Society

Ownership of Universal Oil Products Company was given to the American Chemical Society, according to an announcement made by Dr. Thomas Midgley, Jr., president of the society.

The gift was made with the provision that the million dollar a year income of Universal Oil Products Company should be used for research in the petroleum industry.

The owners of the Universal Oil Products Company are: Phillips Petroleum Corporation, Shell Oil Company, the Standard Oil Company of California, the Standard Oil Company of Indiana, the Standard Oil Company of New Jersey, and the Texas Company. These companies will turn over all of their stocks and securities in the Universal Oil Products Company to the American Chemical Society.

The Board of Directors of the society has accepted the offer in principle and has appointed a special committee to complete the final details. The research and developments efforts of the Universal Oil Products Company will be continued and will render the same service to the refining industry and particularly to its approximately one hundred licensees.

The Cellulose Products Department of Hercules Powder Company, Wilmington, Delaware, offers prints for use, without charge, of "Careers for Cellulose," a 16 mm. sound movie in color. The projector and operator must be supplied by the exhibitor. The 40-minute film traces the story of cellulose from the cotton fields to the manufacturing plants.

How We Do It

George I. Haight

Haight, Goldstein and Hobbs, Chicago, Illinois

Presented before THE AMERICAN INSTITUTE OF CHEMISTS *at Chicago.*

Mr. Haight here answers the talk by Otto Eisenschiml given before the National Lawyers' Guild, on "Gentlemen How Do You Do It," which appeared in THE CHEMIST, February, 1944.

I HAVE read the very interesting article by Dr. Eisenschiml. I knew he was a great scientist. Upon reading the article I discovered that he is a great observer, as all great scientists must be. In addition he is a great philosopher.

He classified men according to their occupations. He began with the men of great genius, such as Shakespeare, Beethoven, Gibbs, and Einstein. He placed such in the first class. They are those at the top.

Dr. Eisenschiml is a very logical man. His thinking is easily followed. He gave a second class: Creators, he called them—inventors, such as chemists, engineers, architects, writers, teachers and the like.

Note that thus far he has not mentioned lawyers. He comes to them in proper order as we shall see.

His next class is manual laborers, farmers, repairmen, etc. He has misclassified the farmers. I am a farmer myself. That is my principal occupation. I practice law for diversion! I must tell those of you who are not farmers, that really to be a farmer you must be a good businessman, you must be a good worker, you must be a scientist in many fields—a botanist, a zoologist, a bacteriologist, a chemist, and a physicist. In fact a farmer touches the whole gamut of the natural sciences.

Then he gives us his next class. He says they are not creators, but that they do mighty useful work. That is something of a concession. In this class he includes street car conductors, policemen, printers, and others.

Then he gives another class. He says they are people, engaged in purely selfish occupations. In there he includes advertising men.

Then he comes down to the seventh class. Note, he has not mentioned lawyers yet. The seventh class is made up of parasites, criminals, and so forth.

And then we get to Class 8, and

in perfectly logical order. Who are they? The lawyers.

He says they are the smartest people on earth. In view of the place he has given them it is clear that they are hardly on a par with the criminals.

But be comforted, we are not the worst. We are not at the bottom. We miss by just one.

The last class that Dr. Einsenschiml mentions is the expert witness. They rank below the criminals and below the lawyers.

One of the best expert witnesses I ever encountered, because I was on the other side, was Dr. Egloff. I shall suggest to him mildly, without violating any professional ethics, that perhaps he ought to hire a lawyer, because of Dr. Eisenschiml's classification.

I shall pause to make a brief defense of experts. I have seen many. There are three kinds of experts.

There is the expert who is a skilled specialist in some particular field. It may be in chemistry, or bacteriology, or medicine or some other field. He is called to give relevant facts. He is examined and cross examined. He is a factual expert.

There is another kind: Opinion experts. They are advocates in a sense. Some people think that when experts on the two sides of a lawsuit do not agree, that someone is lying. Sometimes but seldom is this true. It is not any more true than it is to say that one of two lawyers is lying when they are opposed in some particular advocacy.

The human race has not yet evolved another method that is so satisfactory in getting to the truth about anything disputed, as getting the facts and presenting them, with their clashings, their varying implications and conclusions through opposing advocates.

Experts are often put in the advocate's position. They often disagree as advocates. Indeed they often disagree on facts.

There is a third kind of experts. Sometimes we get into fields that are so intricate, so difficult, that to explain disputed matters therein to their uttermost would be an almost interminable undertaking and perhaps even then might be beyond the average mortal's understanding. So, what do we do? We call in known experts. We get their opinions (we do not try to delve into all of the processes by which they are reached). We let it go at that. This can happen in a chemical case. I like experts as a class, notwithstanding that in Dr. Eisenschiml's sequence he has placed them below the lawyers, and has placed both the experts and lawyers below the criminal.

I do not agree with Dr. Eisenschiml in his classification. Men should not be ranked by occupation.

Regardless of occupation they should be looked upon and ranked in relation to their capacities and the skill, the soundness and the spirit with

which they use those capacities.

Regardless of occupation, for illustration, men are easily divisible into classes like these:

There are some people that are walking in the dark all of the time. You can't do much with them. They are always at the bottom. They are hopeless until somehow they are brought into a circle of light, however small. There are men who carry candles, that shed real light, not in very large circles, but they are necessary and extremely useful. We could not maintain a social order without them.

And then we have another group. Let us call them the lantern bearers. They shed more light in wider circles. All of the time in this democracy of ours candle bearers are moving up and becoming lantern bearers.

Then there are the bearers of the arc lights, who serve in much wider circles of light.

Among these principally are found the search light bearers; they may be chemists, they may be natural scientists, they may be educators, or physicians, or statesmen or men found in many other fields of endeavor.

As to chemists vs. lawyers: which do you consider more important, leaves or earth worms? It is an interesting question. I don't know how many species of earth worms there are in the world. Perhaps around eight hundred. How would human life succeed without them? Without leaves, without vegetation, we would be without oxygen.

So I ask you scientists, which is more important, leaves or earth worms. How do you rank them? Is one more important than the other?

Why rank men in respect to occupation? They are all necessary. All make their important necessary contributions. We can roughly rank them upon the basis of the service they give to mankind.

My own philosophy can be found in a very homely story. It concerns a tenderfoot who went to a Wyoming ranch. He ventured beyond his abilities in trying to ride a bucking broncho. The result was fatal to him. He was duly buried. The cowboys thought that they should put a simple stone marker on his resting place. They did. It was a granite boulder, a cowboy had painfully chiselled upon it this sentence:

"He done his damndest. Angels couldn't have done no more."

That is the test, isn't it, regardless of profession or occupation?

Our country's history is filled with the names and deeds of great men. Who was more important, Miles Standish and John Smith on the one side, or Thomas Jefferson and the others on the Committee of Five who drafted the Declaration of Independence, on the other?

Columbus came in 1492. Leif Erickson preceded him by 492 years. After Columbus one hundred and

fifteen years passed before we had a permanent settlement on the part of the continent we now call the United States.

Why didn't the earlier settlements stick? Those enterprises failed in the main for the reason that in a country that some people now tell us under intense cultivation could support the two billions of humans on this earth, they could not get enough food.

It is probable that the settlement at Jamestown in 1607 would have failed utterly if it had not been for that great soldier Captain John Smith. He made friends with the Indians and at the point of his blunderbuss, borrowed some corn from them. The Pilgrims' colony endured that first winter. What would have become of it had Miles Standish not taken the cache of Indian corn at Truro. Of course it was paid back in first crops.

These were important men in the history of this country.

Should Thomas Jefferson and his associates have been paid for writing the Declaration of Independence? If so, how much? A million dollars? Too little? Ten million? Too little. For that sort of service what should be the money reward? Exactly nothing! Some services are priceless.

Generally speaking it is absurd to measure the accomplishments and the services of men in coin, the poorest, the cheapest of all measures.

What are lawyers? Well, since you are chemists, my idea is that lawyers are catalysts. They have to do with rights and wrongs of human beings. They do not themselves enter into them. The relationship is a professional one.

I shall let you into a few secrets. Let me show you how lawyers work.

We enter upon matters that have to do with railroads. Do we become railroad men. We do not. We engage in affairs involving banks and other financial concerns. Sometimes they are intricate. We go through them as advisers and as advocates in court proceedings. Do we become bankers or financial experts? We do not. We get into irrigation problems, and sometimes with scientific aspects involved. Do we become irrigation experts? We do not. We try mining cases. We work with mining engineers, with geologists, with surveyors, and with men expert in the business. It may be an apex case. We engage in many scientific and business problems. Do we become geologists, mining engineers, or experts in the mining field? We do not.

We are catalysts. Sometimes we get into domestic relations, but we do not necessarily therefore become domesticated.

Sometimes we get into criminal matters, but we do not, with some occasional exceptions, thereby become criminals. We could similarly illustrate in the field of physics or of chemistry.

I brought with me my high school

chemistry. It says "An atom is the smallest particle of matter that can exist even in combination." Tell Dr. Millikan that! There have been vast advances since I went to high school. Chemistry since then has in many respects become quite a different science.

Bacteriology? Yes, I have been in cases involving the science of bacteriology. In respect to one of them, prospective clients came to me and said, "We understand that you have been a student of bacteriology. We have come to retain you to try a case in that field." I said, "I know nothing about bacteriology. I once took a course in bacteriology. This was two years after the founder of that science died. I know enough about it now to know that what little I learned in those days is farther back in that science than is the history of the reign of Rameses III, of Egypt, in the science of government."

I told them that to try their lawsuit I would need a university course in bacteriology. They said "that will take a long time." I told them that it would not if I could choose the university. We organized a university, The faculty comprised four men, outstanding men in the particular narrow field of bacteriology. Our initial course required three days and evenings.

Did I become a bacteriologist in three days and three nights? Of course not. However, in one little corner of that science we did learn those things needed for that particular litigation. And that was all.

Two qualities were needed. One was a little intelligence, one usually starts at zero in respect to the actual subject matter. The lawyer must know how to get things done.

Of course it is not possible for any lawyer, engaged in litigation or otherwise interested in many different fields to get all knowledge in any of them. They do not get it. But with each new matter they go to school, usually a very quick school. They must be good questioners. They must be good listeners. Thus they acquire that little part of any field that has relation to the particular matter in hand.

It is because of this that lawyers lead a most delightful life. Their contacts are very wide, and among all sorts of people. In each new field the lawyer attends a new university of the sort indicated. Often it is one of the best in the world for the particular subject, frequently it is in one's client's own organization. How delightful to go to school all of the time and to attend different universities for short times on specific subjects, and generally with the best faculties obtainable.

The law is the only profession in the world which constantly gives this experience. When all through with a particular course what happens? Does the lawyer get a bill? No. Does any-

one ask for tuition fees? No. After a delightful experience the student is paid. Can you beat it? Really, that is the way it works. It is most interesting.

What does the lawyer give in return? Two things. One is the capacity promptly and accurately to get that essential knowledge in relation to the particular subject. If he cannot do that, he cannot function.

The other is to take that knowledge with all of its strange words and expressions and translate it clearly, concisely and simply to someone else. It may be to a court of review. It may be to a trial court. It may be to a jury. He presents it in a layman's style. He presents it simply. He presents it so that the mind to which it is wholly fresh and new can understand it. That is his service and that is his function.

Lawyers have a happy life. They work hard, live well, and die poor.

Our country's history reveals great personalities of the Bar. They have had a vast influence. That is perfectly natural because of the wide contacts enjoyed by members of the Bar. They are experienced in dealing with all sorts of things, not only in the fields that I have been mentioning but in the fields of government as well.

I haven't anything to say derogatory to the legal profession. It was once defined as:

"A profession as honorable as justice and as ancient as the forms of law."

Don't put lawyers in a class by themselves. As in all other occupations there are many many great minds, ranging from the outstanding jurists, the men of great ability and integrity, down to the merest pettifogger. When you speak of lawyers, what kind of lawyers are you talking about? The men at the top? Or are you talking of some far down in the scale of service?

Among lawyers are the pettifoggers. I wonder if the chemists have their "chemifoggers"? Maybe they do. Fortunately, I have never met such.

I have some ideas as to what the qualifications of a lawyer are. I place as number one, courage. You know there are millions of men who will face danger courageously. There are fewer who will stand against popular delusions. Real lawyers are not seeking fame. They are men wholly willing to live in respectable obscurity. They are not those who

". . . crook the pregnant hinges of the knee."

They have no philosophy that

". . . thrift may follow fawning."

Is it any different with the chemist? I don't think so. Courage is a quality the chemist must possess. It takes courage and judgment to go into a field of vast uncertainty—where there may be costly failure. The man who never goes ahead without insurance against failure, never goes ahead.

It must take courage to be a real chemist as it takes courage to be a real lawyer.

When we look into the lives of the great lawyers, we find that they were men of perseverance, men of real convictions, the kind of men who are willing to labor and to wait. Such men are truth seekers, they have a devotion to facts.

Where do chemists differ from this? Is there a difference? Aren't chemists constantly in pursuit of facts? Aren't they truth seekers? Of course they are. This is their daily life.

The law is a science, as chemistry is. Of course it is not an exact science. It has to deal with truth, but not abstract truth. Wherein does chemistry differ in this respect? The law and chemistry too have to deal with truth in relation to the practical affairs of men and the relations of men.

The philosopher as well as the scientist is always seeking truth. One of the things that the lawyer has to guard against, and so does the chemist, is that ever-to-be-resisted pressure to be unsound in their determinations and in their advocacies.

With the lawyer public confidence comes slowly. It is right that it should. But when established it endures very well, and even against the attacks of assailants.

Confidence of the courts comes, too, because no one knows better than do the courts before whom lawyers appear, the kind of stuff of which they are made.

In the relations of chemists to their various affairs and in their various dealings, is there a difference. I think not.

Of course no lawyer is ever found to be always right. That cannot happen. There couldn't be any lawyer with such foresight. Courts differ from each other. The same court sometimes on one occasion may differ from itself on another occasion. Juries differ. Facts are sometimes hard to get. Sometimes they are greatly in dispute. This must always be so. No lawyer can always be on the winning side.

The only lawyer for whom this is possible is the one who tries one lawsuit, wins it, and quits. Such lawyers are not of much service.

Among lawyers there is one quality that stands very high. It is not a moral quality. It is intellectual honesty. One must have reasonable intelligence to have the capacity for intellectual honesty. He can be ever so honest morally and yet not be intellectually honest. An intellectually honest lawyer must be one whose eyes really see and whose ears really hear, he must not be diverted by prejudice or by clamor, he must not be led astray by wishfulness, he must ever travel in paths that are direct and that are simple.

Do you chemists differ from this?

Some of you will look through a microscope ten thousand times in the hope that the next time you will make the discovery. You will try this and you will try that, skillfully and in good order, all in the hope that you may make the find. Sometimes you get it, and don't know why. Then the search begins. It often takes endurance and limitless patience. Above all it takes intellectual honesty. You must not be deceived in thinking that you see, thinking that you learn, thinking that you find what you hope to see or to learn or to find. Isn't this true?

Certainly you can pick out of your profession a great many men like that. You know of men like that who have passed on. Willard Gibbs was one. Respecting him I hope someone someday will write a real biography.

But, courage, endurance, moral honesty, and intellectual honesty are not enough. You must have something more. And that is the capacity to work—to do unremitting work.

Lawyers, because of their many contacts, because of the many different fields that they enter upon, can use very well the background of a good general education. I have been privileged at times over many years, to speak to students in law schools. I always make the point with them that they must broadly enrich their minds. It is helpful for their thinking. And it is also helpful for developing the power of expression.

The reading of the Bible is good. I do not know of a better example of quick, clear statement of many facts than the one found in the first two chapters of the Book of Job. I don't know of a better example of a preface for a speech, a brief, or a paper, let us say the paper of a chemist, than that found in the Prologue of Chaucer's Canterbury Tales.

From the lawyer's standpoint, how many examples that are easily usable as analogues can be found in Aesop's Fables. Some of those were written during Egypt's early history.

A good lawyer just like a good chemist is the kind of man to whom some very simple tests can be applied. He should be genuine. I like lawyers that one can fish with, or shoot with, or sail with. They are then not running in regular paths. They are constantly meeting novelty and change. Then their genuineness can be easily judged.

I suppose in respect to law, and in respect to chemistry, there may be quite a difference between discovering and teaching. Some men do both very well. Some men do only one very well. Lawyers must be teachers. That is their function. Also they must be taught. They are taught by chemists, and by physicists, by bankers, by railroad men, by manufacturers, by business men, and many others. They are taught constantly in order that they may teach, and teach quickly, clearly and concisely.

Another thing: If one has nothing to say, he should remain silent. If he has something to say usually it is not well to be too long in saying it. There is an art in how to say it.

Perhaps it will be interesting to you to hear a paragraph once written by Judge Cardozo. I have read it on other occasions. It is full of meat—for the lawyer, for the chemist, or for anybody who has something to transmit by language. I shall read it:

"We are merely wasting our time, so many will inform us, if we bother about form when only substance is important. I suppose this might be true if any one could tell us where substance ends and form begins. Philosophers have been trying for some thousands of years to draw the distinction between substance and mere appearance in the world of matter. I doubt whether they succeed better when they attempt a like distinction in the world of thought. Form is not something added to substance as a mere protuberant adornment. The two are fused into a unity. Not long ago I ran across a paragraph in the letters of Henry James in which he blurts out his impatience of these attempts to divide the indivisible. He is writing to Hugh Walpole, now a novelist of assured position, but then comparatively unknown. 'Don't let anyone persuade you—there are plenty of ignorant and fatuous duffers to try to do it—that strenuous selection and comparison are not the very essence of art, and that form *is* not substance to that degree that there is absolutely no substance without it. Form alone takes, and holds and preserves substance, saves it from the welter of helpless verbiage that we swim in as in a sea of tasteless tepid pudding.' This is my own faith. The argument strongly put is not the same as the argument put feebly, any more than the 'tasteless tepid pudding' is the same as the pudding served to us in triumph with all of the glory of the lambent flame. The strength that is born of form and feebleness that is born of the lack of form are in truth qualities of the substance. They are tokens of the thing's identity. They make it what it is."

How do we do it, Ladies and Gentlemen? In the same way that you do it.

Reconversion Plans Encouraged

Paul V. McNutt, chairman of the War Manpower Commission recommends that engineers and technicians now be assigned to reconversion planning to prepare industries for civilian production. Plans made now will shorten the time necessary to get civilian production underway following the close of the European phase of the war. However, the assignment of personnel to reconversion planning must not interfere with present urgent war work.

What Is The Answer

Otto Eisenschiml, F.A.I.C.

Scientific Oil Compounding Company.

Dr. Eisenschiml, on hearing Mr. Haight's discourse on "How We Do It" protests that he has not yet found the answer.

MANY years ago I read a story by Jules Verne called "The Children of Captain Grant," The captain's ship, it appears, had been stranded in an out-of-the-way spot, but he managed to make its location known to his children on a slip of paper which he had inserted in a bottle. When this paper was picked up, however, it showed only the latitude, some 37 degrees south, the longitude had been washed off. Thereupon the children rented a ship to sail it around the world at the given latitude. Eventually they were bound to strike the point where their father awaited them.

Much of the territory at that latitude being inhabited by Spanish people, a college professor was invited along, whose duty it was to learn Spanish on the trip and act as an interpreter. But when the travelers landed at the first coast where Spanish was spoken, the professor and the natives did not understand each other. The absent-minded professor had studied Portuguese by mistake.

This story came back to my mind as I listened to Mr. Haight's discourse. His entire contention was based on the assumption that I had put the lawyers as a class below the criminals; on that basis he made out a good case. But I hadn't said anything of the kind. What I had said, after discussing the comparative usefulness of various professions, was this: "Goodness—I forgot to mark a spot for the lawyers in my blue-print. But you (lawyers) are smart and will undoubtedly find your own niche without help from me." As to expert witnesses, I had not mentioned them at all in this connection.

And so while I had argued in Spanish, Mr. Haight has answered me in Portuguese. Like Don Quixote, he has fought a windmill and demolished it, but the windmill was not mine, and I disavow any relationship to it.

My worthy opponent compared the role of a lawyer with that of a cata-

lyst. A lawyer, he said, mingles with men in many walks of life and, as I take it, exerts a stimulating influence on them. That's what a catalyst may be expected to do. To prove his acquaintance with chemistry, the speaker showed us a book from which he had studied, and you have seen him throw it on the table with a gesture of scorn, because, written in 1881, it still taught that the atom was the smallest indivisible part of matter.

I cannot share his scorn for these early books of chemistry; at any rate, a catalyst was defined then, as it is now, as a substance which either brings about a chemical reaction which would not take place without it, or else hastens a reaction which would in its absence take place at a slower rate.

How well this fits the part of a lawyer! Imagine two men in a dispute. In the absence of a lawyer they could not possibly come to terms. They could not split their difference on a 50-50 basis over a drink or two, could they? So they use a lawyer as a catalyst. They start suit against each other; the suit comes to trial in say two years, whereupon an appeal is taken, postponing the final decision another few years. If Mr. Haight considers this catalysis, it must be so; maybe a sort of catalysis in reverse.

Ralph Waldo Emerson once said something to the effect that war destroys the cobwebs of our civilization, showing, all things in their rat nakedness. Well, let's look at what chemists and lawyers are doing in this war. No need of my telling you about the work chemists are doing. I never see any chemists' names mentioned in the papers, and therefore I assume that they are doing nothing. But the lawyers! Thousands of them are busy in Washington, figuring out rulings which they promulgate to the hard-working nation in their own Poetical language. Listen to this gem, for instance:

"All commodities listed in Appendix A are those known to the trade as such, excepted therefrom such thereof, if any, while subject to another regulation."

Undoubtedly this is the essence of wisdom, but it is wasted on a dumb bloke like myself whose knowledge of the English language does not extend much beyond the comic strips of his newspaper. Unfortunately, it is dumb blokes like myself who have to abide by these rulings and lose a good portion of their working hours trying to interpret them.

Suppose we chemists would put firearms into the hands of our fighting men with a direction like this:

"Elevate the temperature of the charge to the ignition point and take full advantage of the expansion which follows the change of a solid body into the gaseous state,"

instead of simply saying: "Pull the trigger and fire." If we were accused of sabotage, I think we would be forc-

ed to plead guilty. Yet, for two and one-half years millions of businessmen have taken the Mumbo-Jumbo of these legal directives lying down. What would they do to us chemists if we would file our daily reports to them in such chemical verbiage? How do the lawyers get away with it?

Mr. Haight has spoken at considerable length and has said many things which impressed me. Yet, my wonder why the standing of the lawyers is so far above that of our own, remains unsatisfied. Perhaps I am like the slow-witted prince who many years ago was shown through an automobile factory. He tried hard to understand the mechanism of what was then still known as the horseless carriage, and after all the inner workings of the mechanism had been explained to him, from spark plugs to transmission gears, his guide turned to him and said: "If there is anything your Highness has not understood, I shall be glad to explain it." Whereupon the prince answered: "I understand everything except this: How does the damned thing run without horses?"

And so I turn to Mr. Haight and confess that I got everything from this talk except the answer to my question: "Gentlemen, how do you do it?"

Where Does the English Lawyer Stand?

F. W. Leffer, F.A.I.C.

Universal Oil Products Company.

IF you enter the Law Courts in London you are spellbound. An atmosphere surrounds you separate and apart from the rest of the world. Not that atmosphere of the chemical lab, nor that of the steel mill, nor that of the busy Strand. You enter the quiet but highly efficient environment of the English legal world permeated by the tradition of centuries. You may see counsel in "silk," as the court sits and disposes of modern disputes in the mellow atmosphere of dignity of over a hundred years ago.

Suppose that some time before 1940 after your visit to the law courts you had accompanied your barrister friend to his "chambers" or club. It may have been the Lincoln's Inn, Gray's Inn, or the Inner or Outer Temple, each surrounded by the busiest thorough fares of London, yet each a place of restfulness and the reserve of yesterday, a retreat the like of which the chemist or chemical engineer has never possessed.

This world of the English barrister existed before the modern scientific in-

stitutions came into being. It characterizes the social standing of the barrister and King's or Queen's Counsel, as the case may be. The English barrister, in the eyes of the public at large, not only occupies a social position separate and apart from the industrial and scientific world, but he is also a leading character in the front rank of politics and statecraft, a position second only to the Court of the King and the Parliament.

Somewhere closer to the profession of the chemist there stands the English solicitor, the general practitioner of law upon his admission to the Law Society, whose stately headquarters are located on Chancery Lane. As you undoubtedly know, it is to a solicitor that you address yourself in any inquiry concerning a proportion of law in England, while the barrister is your solicitor's spokesman in pleading your case.

Largely because of this procedural difference you have far more in common and in the eyes of the public are more readily comparable as professionals with your solicitor than with King's Counsel or junior barrister representing you in Court. Yet I dare say the English solicitor, by virtue of his enrollment in a single organized association and the greater publicity given to his activities, occupies a more prominent and better defined or understood place in the public mind than does the chemist or chemical engineer.

In times of war, as now, it may be that the Royal Navy, Air Force and Army have gone to the foreground of English life; but the English lawyer participates therein, inasmuch as a tremendous number of barristers and solicitors volunteered for the services and particularly for service in the Royal Air Force, thereby depleting the ranks of those of the legal profession remaining behind to look after the rights of the country and the people in it.

Far be it from me to suggest that there are no other deserving professions in the United Kingdom. The chemist and chemical engineer undoubtedly rank high. Whether they would be considered to occupy a place of importance in the mind of the public relative to that of doctors or bankers and other professional men is a question for argument.

Certain it seems that the chemical world does not occupy in England the prominence which it enjoys in this country unless it be in competition with the commercial world. The tendency for lawyers to assume executive positions in industrial and commercial enterprise is not so great in England as it is here, but it undoubtedly exists, and seems bound to become more pronounced after this War.

New Thanite Plant

Hercules Powder Company has placed into operation at Brunswick, Georgia, a new and larger manufacturing plant for Thanite insecticide.

How About the Lawyer in Germany?

F. W. Leffer, F.A.I.C.

HISTORY undoubtedly has shaped the position of the legal world in comparison to that of the scientific world in many countries and this is particularly true in Germany, or I should perhaps say, pre-war Germany. Ever since the days of Frederick the Great the German people have looked upon the lawyer as an eminent personage.

He has retained some of the mystery that surrounds the practice of law, and he has retained even to this day the respect that arises from a trust in the justice of the courts. The chemist and the chemical engineer have acquired prominence far later than the lawyer, and in social life, as in the eyes of the public, they probably have not yet reached the standing occupied by the German lawyer.

In a small town not having its own courts, the solicitor who handles the legal affairs of the people of the township occupies a position second only to the mayor. The judges and lawyers of a provincial town greatly influence the shaping of local policies and education. The Reichstag, established in 1870 as the German Supreme Court, is looked upon by great and small alike with the deepest respect as the ultimate authority not merely in law but in administering justice.

The success of the German lawyer in modern times preceding the Nazi regime has been due in a large measure to a uniformly high standard of exacting educational requirements and also to his tools in the form of well-drawn codes which prescribe the rules of law to be applied to any given factual situation. These codes have been formulated in the course of the last seventy-five years; the German Civil Code which became effective about 1900 after a preparatory period of twenty-five years has been described by Professor Maitland, a great English legal scholar, as "the most carefully considered statement of a nation's laws that the world has ever seen."

We all know that even the Nazi Regime was unable absolutely to subjugate the Reichstag to the schemes of regimentation so characteristic of the Nazi system. But we also know that the law of the German people

under the Weimar Constitution could not live under Hitler from the day he abolished all political parties but his own. How the lawyer and the law were made to conform to Nazism may be illustrated by the following statement announced before the Eleventh International Penal Conference at Berlin in 1935 by the German Minister of Justice:

"We have substituted for the outworn maxim 'nulla poene sine lege' (meaning no punishment unless some specific law has been violated) the more efficacious doctrine 'nullum crime sine poena' (meaning there is no crime for which there is no punishment)", regardless whether or not some specific existing law has been broken.

In the scheme of regimentation under the Nazi system the German legal profession has suffered a setback. It has had to take a seat in the shadow of the leading role given to the labor world and to industry. Thus, particularly since about 1936 the chemist and chemical engineer as a group gained at the expense of the legal profession. Many lawyers who submitted to Nazism willingly traded some of the plain soundness of the established legal body for a more splendid cloak of a flimsier substance.

In this connection, it is interesting to note that much of the traditional formality prevailing in the German courts before World War I was lost after that war in the course of the internal revolution and readjustment, and it was Hitler who restored some of this traditional formality, perhaps with the object of injecting into the people some of the awe for the court which they had lost in the years of internal upheaval after World War I.

A distinct trend in recent decades in Germany is the increasing participation of the legal world in the management of industry and commerce, and here we find a close parallel to the American trend which undoubtedly tends to place the lawyer and the practitioner of applied sciences on a more or less equal footing.

The present war has already lasted long enough to eliminate many of the staunch followers of the principles governing the legal profession in pre-Nazi Germany, and it is difficult, if not impossible, to predict the position of the lawyer in postwar Germany. There appears to be good reason, however, to believe that the legal profession through sheer necessity will retain a dominating position after this war in Germany as the people can hardly do without it in straightening out the innumerable injustices, inequities, and other hardships fostered under the dictate of Nazism.

There should then be a competition between the chemical world and the legal world to lead in the process of restoring Germany to a peaceful nation.

Laurels for Chemists – None For Lawyers – in U. S. S. R.

J. G. Tolpin, F.A.I.C.
Universal Oil Products Company.

IF you read the general press of the U.S.S.R., you will naturally find military heroes glorified more than any other men, but the worker and technician, the production man, the scientist who makes the production possible, run a close second. They shared the limelight with important government officials, writers and artists until the war spread to U.S.S.R., and they are likely to be there again as soon as the war is over, and restoration of the country and further industrialization are resumed at a rapid tempo.

Of the technical professions, let us single out the chemist, although the benefits for the chemist are in no way greater than for other technical and professional people. Together with miners, steel mill workers, botanists, and agricultural experts, the chemist participates in all kinds of drives for production, participates also in planning overall production and its details.

His research is vital, his teaching ability important for training workers; his speaking and writing ability are sought by various clubs, by semi-technical journals, by bibliographical services and the like. He is frequently found among the winners of various competitions for production goals, he is mentioned as a promoter of the Stakhanovite movement for efficiency in industry and similar drives.

He proudly displays various orders and decorations, and aspires to and actually wins the title "hero of labor." He figures as a hero in literature. If he is talented enough to reach the top in his profession, he is elected to a scientific body of prominence, the highest being the Academy of Sciences U.S.S.R. He will then get notice in the special press whenever an anniversary of his career comes around, or an advanced birthday, or simply on the occasion of his election. He may even get front page publicity in the general press on these occasions.

Where does the lawyer stand in the Soviet Union of today? By comparison, very low indeed. Lower than members of other professions, including teachers and mathematicians. I know of contests in these two professions, but I have never read of any contests of lawyers. Either this pro-

fession is in a state of obscurity, as it seems to me, or it is for some other reason not mentioned in the publications of the Academy of Sciences U.S.S.R., including its Vestnik (Bulletin), which is devoted as a rule to general reporting about the activities in the scientific life of the U.S.S.R.

Celebrating twenty-five years of the existence of the Soviet state, the Academy of Sciences held a meeting on November 15, 1942, at which Academician A. A. Baikov reviewed the activities of the Academy. Only two works on law, both by A. Ya. Vyshinskii, were mentioned among the important publications of the Academy during this period (the Department of Economics and Law of the Academy of Sciences U.S.S.R. was organized only in 1938), against the numerous works and achievements in technical and biological sciences.

There are at least 50,000 chemists in U.S.S.R. and facilities for training about 5,000 chemists and chemical engineers a year. In all plans for the development of national industries of U.S.S.R., training of chemists and their assistants was included as a national necessity. All other branches of technology were likewise treated. I may be prejudiced by virtue of the fact that I read for the most part the technical Russian literature, but I do not recall seeing any statements that the Soviet Union needs more lawyers and that their training is to be expedited. I do not follow the special legal Russian literature. My incidental contacts with this literature show that as late as 1939 and 1940 complaints were voiced against the qualifications of many lawyers in U.S.S.R. and that in some regions the number of practicing attorneys was smaller than required by an allotment of 1939. Apparently not many young people are attracted to the legal profession.

After the Revolution, all professionals suffered much in their social status and earning capacity. Official estimates showed that in 1928 the earnings of teachers and physicians were lower than the average earnings of skilled workers, and by 1935 their status improved and their earning capacity approached about 90 per cent of that of a skilled industrial worker.

The earnings of professionals generally rose in later years, but with the progress of industrialization the limelight was turned by the governing bodies on the technologist.

Both chemists and lawyers are essentially hired men. The fees of a lawyer are regulated by the government. However, chemists have more opportunities to reach a higher level of earnings. Chemists have a chance to earn by writing or consulting and in some cases they hold part-time jobs in addition to their regular positions. Legal matters and sensational trials as subjects for writing talent of a lawyer do not exist.

The business of an American cor-

poration lawyer is extinct in present-day Russia. The relations between the state and the individual are regulated by decrees of the government. The contracts made by various industries for production plans are concluded as between two branches of the government, and even though I read of cases of non-fulfillment of schedules being presented for arbitration, they do not involve the type of legal work we know to be required in similar connections in this country.

It may be remarked that dockets in Soviet courts include criminal as well as civil cases, for the law does not abolish personal property, that is, consumers' goods; only private ownership of means of production is against the policies of the Soviet state. In certain court proceedings, the presence of a lawyer is required, for instance when the defendant is a minor. In politics graduates of law schools have no standing favoring them over anybody else.

In August, 1939, a new law was adopted by the Soviet government pertaining to the position of lawyers in the Soviet Union, placing the emphasis on the so-called "colleges of lawyers," which roughly approximate in function our bar associations, and designed to bring about more uniformity in the position of the legal profession throughout the individual republics of the Soviet Union, which was lacking up to that time. Apparently, some judges treat the lawyers in their courts rather unfavorably.

On the other hand, it has also been stated that admission into the legal profession is frequently based on pure formalities, not much attention being paid to the quality of a lawyer's work, and that many members of that profession have little education and are helpless in the courts. Lack of official instructions which would guide a Soviet lawyer and absence of senior colleagues who could give advice were also indicated as causes of his unsatisfactory work.

According to the new law a candidate can be admitted to the "college of lawyers" if he is a graduate of a law school, or has three years' experience as a judge, prosecutor or legal advisor, or has partially fulfilled the above two requirements.

I cannot quote precise earnings of lawyers and chemists in rubles, for the ruble is not quoted on exchanges outside of U.S.S.R. Its value was set by the Soviet government at between 19 and 20 cents. Calculation of its actual purchasing value in the U.S.S.R. would require the work of a better economist than I claim to be. Around 1936 the salaries received by lawyers from their collectives were mentioned to reach the upper limit of 1,000 rubles per month. It is quite likely that they are much higher now, as the cost of living is generally higher. A chemist may receive basically the same salary, but his income is augmented by the additional sources

mentioned above, and the closer he is to the top of his profession, the larger these are.

An interesting indication of the attention paid to technical people, including chemists, as contrasted to lawyers, is seen from the lists of various awards.

Of the state awards, the Stalin prizes for important researches, inventions and works of art may be used as a good reflection of the importance of the professions under discussion. The law of 1939 pertaining to Stalin prizes as modified January 1, 1942, establishes two first prizes of 200,000 rubles each and two second prizes of 100,000 rubles each in twelve branches of sciences, beginning with chemical and technical sciences and ending with philosophy and law.

Further, two first prizes of 100,000 rubles and two second prizes of 50,000 rubles each in nine branches of art are awarded, and two first prizes of 100,000 rubles and two second prizes of 50,000 rubles each of the four branches of literature. A special group embraces inventions, including military inventions, in which there are ten first prizes of 100,000 rubles, twenty second prizes of 50,000 rubles and thirty third prizes of 25,000 rubles.

In 1942, prizes were awarded for achievements in 1941 in all these branches of science, but none were awarded in law, and some of the prizes in economics were given to natural scientists and engineers. Thus, the president of the Academy of Sciences, V. L. Komarov, was awarded the first prize for directing a survey of natural resources of Ural and Kazakhstan important for the war effort. Neither are any prizes for works of law to be found among those awarded in 1941 for achievements made in 1940.

However, the above largely reflects the attitude of the government circles; while the government controls very largely the official attitude of the people, it seems to be established that in public esteem artists and writers rank higher than scientists and engineers, medical people come next and lawyers trail far behind. Some writers are said to have collected very big royalties for books and dramatic works.

Milkweed Seed Oil Useful

Drs. Paul E. Spoerri, Herman J. Lanson, and David Habib of the Polytechnic Institute of Brooklyn, reported before the Division of Paint, Varnish, and Plastics, at the American Chemical Society's recent meeting, that the oil from milkweed seeds was suitable for use in paints as well as for edible purposes.

Milkweed floss is currently used as a substitute for kapok, but the seeds which contain 23 per cent oil, were discarded as useless, until the Brooklyn Polytechnic reports were made.

The Scientist, Technologist, and Lawyer in France

J. D. Seguy
Universal Oil Products Company.

THE inventions and discoveries of French scientists, technicians and medical men have already contributed vitally, as you well know, to those arts which have assumed an ever larger importance in the life of the people and its welfare in present times.

Consecrating their efforts to research, these men, save for rare exceptions, have shunned political life.

French lawyers have assumed a large part in politics. I have known several top lawyers who were members of the Senate and of the House, and their case was not exceptional. Thus, their influence on political and social evolution, through both the legislative and the judiciary, has been more direct than that of the other professions.

But by the same token they suffered from the general French opinion that, in the last decades, political action and social trends have gradually degraded and failed to preserve France's patriotic and democratic spirit which had made her one of the strong nations of the last century; and the standing of the politico-lawyers had so depreciated that the reputation of the entire profession suffered.

Speaking of the legal profession in its practice of the law, its standing remains unimpaired; but in many cases, particularly patent cases, lawyers can not perform without technicians and scientists. In patent cases, tried in France without oral evidence, the lawyer relies largely on the advice of technicians and scientists for the preparation of its briefs and arguments. Indeed, selected technical men and specialists in the various sciences and arts form an advisory panel from which the Court frequently draws assistance, in the form of reports and opinions, before deciding a lawsuit.

From the point of view of social welfare, the part taken by the scientists and technicians, as well as that played by medical men, has been infinitely more prominent and constructive than that of the lawyers.

Of course sincerity, integrity, and ability have always attached and still attach to a large proportion of the French legal profession and the post

war problems will undoubtedly require from them important contributions.

During the last two years, I have had occasion to look into the future of France, through conversations with many Frenchmen, including some who now sit at Algiers, either as members of the French Committee of National Liberation or as members of its consultative assembly. Many of these men had come out of France after its occupation by the enemy, some as recently as a few months ago, after having built up the internal resistance organization of the French people against the Nazis and Fascism. The hope of France's future rests in them.

I can assure you that, partly as a result of the discredit thrown on the men of prewar politics, partly because the reconstruction and reorganization of France, in one word, her resurrection, will involve a maze of technical problems. These leaders consider that scientists and technicians will be more essential than they ever were and that their usefulness will far exceed that of any other profession.

The Lawyer in Roumania

Ion Edeleanu

Universal Oil Products Company.

THE laws of Roumania follow essentially the Code Napoleon and the laws of France. Since the culture of the Roumanian country as a whole is of a relatively low standard, people come to the lawyer for assistance not only in matters of law but also for obtaining contacts with businessmen, industrialists, politicians and government agencies.

As a result, the legal profession wields a strong power and influence in shaping the country's welfare. The character of many of the lawyer's transactions places him into an advantageous position in society thus facilitating his ultimate career as a politician.

In comparison with the position of a lawyer, the Roumanian chemist is practically unknown. Most of the industry within the country is dominated by the enterprise of foreign interests, and the domestic scientist, chemist, or engineer faces a stiff uphill fight to approach the social and political importance attained by the lawyer.

Status of the Legal Profession in South America

Remarks by

Gustav Egloff

SEVERAL years ago I was a member of a group of twenty-one who made a trip to six South American countries as representatives of the National Research Council to study chemical and industrial opportunities.

In the six countries visited—Colombia, Peru, Chile, Uruguay, Argentina, and Brazil—one came to the inevitable conclusion that the outstanding professional group in these countries was the lawyer, with the medical group next, dentists third, and chemists and engineers on a low scale.

In one country a chemist and chemical engineer who had studied in the United States returned to his country and obtained a position with the government. After several years of this, he decided that there was no future in it for him and resolved that he would become a lawyer, which he did. He stated that an educational and economic program must be worked out in order to raise the status of scientific, technical and engineering manpower in these countries.

Scientists Need to Advertise Themselves

Remarks by

H. A. Wagner

Past President, American Association of Engineers.

IT seems to me that lawyers are known and respected by most of us, not so much because of what they do or say, but because they make so much noise about everything they do. In other words, it seems to be their religion to take good advantage of every opportunity that comes their way, and to make cock-sure that everybody knows about it. They certainly believe in advertising themselves and their "bill of goods," while the

chemist and the engineer prefers to sit in their offices or in their laboratories, buried deep in their technical problems, unmindful of the public they serve. They depend too much on "the other fellow" to sell their wares and to give them the recognition they think is theirs. The engineer, and the chemist as well, is purely and simply an individualist. His technical world in his oyster and he has thus far failed to see the advantage gained by opening up his little shell and letting the world know he is inside.

Unlike the lawyer, he prefers to hide his light under a bushel, with the consequential results.

Of course engineers and chemists are mostly employees. They are not in business for themselves as are doctors and lawyers and I sometimes think that it is not fair to compare the professions for that reason. As a matter of fact the entire college training of lawyers and doctors is designed to enable graduates to hang out their shingles as quickly after graduation as possible. They are taught to take the lead and assume responsibilities.

Lawyers and doctors get a tremendous amount of publicity, while on the other hand the poor engineers and the chemists get practically none, not because their work is not important and well done, but because they do not work for it. Take the annual reports of our companies. You never find the chief engineer or the chief chemist listed among the official family; on the other hand, for instance, in England engineers and chemists are always mentioned in various company reports.

I once asked the firm that designed the Chicago Daily News Building, the name of the engineer or engineers who should be credited with the design, and lo and behold the members of the firm told me, "Why the engineers were just employed by us. WE did the design, and WE take the credit."

What the engineer and the chemist needs is to crawl out of his shell, take a look around, become vociferous. The engineer and the chemist must take an interest in civic affairs; he must become a part of his community, take an interest in its activities. Engineers and chemists . . . all technologists . . . must form themselves into a pressure group in order that their voice may be heard in the legislative halls and in the offices of industry the country over.

Maximilian Toch Elected to Honorary Membership

Maximilian Toch, F.A.I.C., President of Toch Brothers, Inc. was elected to honorary membership in THE AMERICAN INSTITUTE OF CHEMISTS at its meeting held on September 10. Dr. Toch is a charter member and former president of the INSTITUTE.

New Textile Developments

Donald H. Powers, head of Monsanto Chemical Company's textile research program, reported new developments in textile manufacturing at the recent American Chemical Society Convention. The newly developed Syton solution adds fifty epr cent to the tensile strength of cotton. Melamine makes wool fabric shrinkproof, and by special processes these resins are enabled to penetrate the wool fibers themselves.

Brown Workers Honored

Employees of the Brown Instrument Company, Philadelphia, Pennsylvania, were given all honors in the acceptance ceremonies of the Army-Navy "E" award held recently. The workers were responsible for the company's successful war efforts, said E. B. Evleth, general manager, and so company executives were omitted from the acceptance ceremonies. This is the second renewal of the Army-Navy "E" award to the company.

Chemical Institute of Canada Formed

Ninety-five per cent of the members of the Canadian Institute of Chemistry, the Canadian sections of the Society of Chemical Industry, and the Canadian Chemical Association voted to amalgamate these organizations into a national institute to be known as the Chemical Institute of Canada.

Tectonic Map of United States

Dr. Chester R. Longwell, Henry Barnard Davis professor of geology at Yale University, and chairman of the committee of sixteen members to prepare a tectonic map of the United States showing its complete geologic structure, has announced the completion of this work.

The map is four by six and one-half feet with a scale of forty miles to the inch, and will be particularly valuable to petroleum geologists, instructors in geology, and research geologists. Copies of the map will be available in November and will be for sale at cost by the American Association of Petroleum Geologists, Tulsa, Oklahoma.

Cope Awarded Chemical Prize

Arthur C. Cope, associate professor of chemistry at Columbia University, was awarded the American Chemical Society prize of $1,000. Dr. Cope was cited for outstanding research in organic chemistry.

Representatives of chemistry starred in *American Men of Science* in 1943 showed a median age of 43; the oldest, 59; the next oldest 59; the youngest 29; and the next youngest 33. Among the other sciences, the median age was lowest in Astronomy and Mathematics, 36 and 37; and highest in Pathology and Physiology, 52 and 50.

What the Brazilian Chemical Association is Doing

C. E. Nabuco de Araujo Jor

BRAZILIAN chemists met in April, 1939, at the Instituto de Pesquizas Tecnologicas, Rio de Janeiro, to found the Associacao Quimica do Brasil.

The objectives of the society are to unite professional chemists and those in related branches of technology in the country; to institute standards of ethics; to approve instruction in chemistry and technology; to extend the knowledge of the science of chemistry, and to award prizes for the development of science.

The Association also has as objectives the stimulation of scientific and technological research; the maintenance of scientific and cultural interchange between chemists or scientific societies of foreign countries; and the promotion of congresses where scientific papers and research are presented which will contribute to the development of science and to the progress of Brazilian industries, and to the welfare of the Brazilian people.

A member of the Associacao Quimica do Brasil knows that upon being admitted he is above all contributing toward the prestige of his profession, and to the scientific, cultural, and industrial development of Brazil. Thus admission to the society is an honor to those who become members, and who contribute to a realization of the objectives.

The headquarters of the Association is in Rio de Janeiro, where the Secretary's office is located.

The Association is governed by a Board of Directors and a Directing Council. The first group has executive functions, and the second, deliberative and guiding powers. The Council is composed of representatives of local sections, on the basis of one councilor for each fifty members, and of five general councilors, elected in the same manner as the president. The Board of Directors itself belongs to this Council.

Membership is comprised of three groups: Individuals, Corporations, and Corresponding Members. The latter represent foreign chemists who may, if specially delegated, represent the Associacao in foreign countries. Individual members are those who have a degree in chemistry or who can present satisfactory proof of

knowledge and culture by means of produced or published works. Corporation members are represented by industrial or commercial firms or societies which are connected directly or indirectly with the advancement of the objectives of the association.

At present, the Associacao has eight local sections in the states of Rio Grande do Sul, Parana, Sao Paulo, Minas Gerais, Baia, Pernambuco, Paraiba, and the Federal District. These sections meet periodically to discuss papers, hold conferences, or to consider subjects relating to the cultural aims of the Association.

Up to the present time, the Associacao has held three scientific congresses, one in Sao Paulo in July 1941; another in Curitiba in January 1943, and the third recently held in the Federal District. The number of people attending and the number of papers presented demonstrated the vitality of the association, the interest in the objectives, the cooperation of industry and commerce toward the success of the association, and the national enthusiasm for this project.

The organization now has over six-hundred members in all classes. The budget for 1943 was over one-hundred-thousand cruzeiros. Two additional budgets are now being constituted, one for the construction of the future headquarters of the society, and the other to cover awards for research.

The Associacao has been represented at all scientific meetings held in foreign countries, either by members who attended the meetings or by special delegation of the correspondent members. The benefits from this have been numerous, giving the Associacao the best cultural reputation in foreign countries, and especially in the other countries of this continent.

The library is one of the cares of the administrators. It started with a valuable gift and was enlarged by subsequent donations from other members, and from organizations such as the British Council and the American Library Association. Gifts have also been presented by foreign publishers, particularly those of England and North America. The association would like to establish libraries in its various local sections, and asks for collaboration from all who will assist it.

Fifty per cent of the members' annual dues go toward subscriptions to the society's publications, of which there are three: The monthly "Boletim," which contains news of the society; the "Anais" which contains original papers read at the Congresses and local section meetings; and a directory which is published annually.

Felix N. Williams, formerly production manager of the Phosphate Division of Monsanto Chemical Company, recently became general manager of the company's Plastics Division at Springfield, Massachusetts.

Chemist With a Sword

What does the chemist, taken from his laboratory and transplanted to the battlefield think about the future of his profession? An Institute member jots down his thoughts while under fire during the invasion at Anzio beachhead.

ON the eve of the invasion, I review the experiences which have come to me, a scientist on the threshold of world change, and try to analyze the future as it will affect the career of the individual scientist who serves in the armed forces instead of in the laboratory.

Often in the laboratory, I carried out experiments, not knowing their outcome or possibilities but subconsciously sensing that something worthwhile would develop. So do I feel now as thoughts and emotions rush through my mind. Is this a needed chapter in my life? Shall I accidently discover something through my experiences?

The scientists' pure self-devotion to duty and creation is an example of perfect human behavior. The high-minded purposefulness of science is convincing more and more people of the true ideals which are worth-while. Scientists are the most faithfully pure of individuals in these times—devoted to truth, accuracy, and creativeness.

I am trained as a scientist, as an analyst of physical and chemical occurances, and I am best fitted by ambition and inclination for that work, even though the way is frequently hard and takes struggle to maintain it. My mental abilities surpass my physical stamina, yet with many other chemists I find myself in the army, where my physical ability is of more importance than my mind. I am proud to serve my country and to do my duty. However, in a world at war, the abilities of the proficient should be used where they are most capable, and many scientists can do more for their country in the laboratory than as individuals on the battlefield.

Scientists do not desire to hide behind a "cloak of protection" and claim immunity from war service in the sacred name of science, but if they are capable of giving to their country greater gains through laboratory work than they can through individ-

ual service, they should be kept in the laboratory. Scientists of ability in non-essential jobs could well be transferred to government laboratories for the duration.

To force a scientist to serve in arms merely because he is strong and healthy, as has happened to many of our physically fit young men, is an alarming situation, for our future scientists are being sacrificed to lesser needs.

Many of our young scientists who were chosen for military service were placed in improper assignments. In this way we lost many able scientists to the future world. Among these may have been another Moseley whose work is forever lost. We must not make these errors again.

Those of us who are now on the battlefield are not afraid to die as others do for our worthy cause. Indirectly we are helping the future science of our nation by winning raw materials for our peaceful crucibles, which will gain for us a better future life through which we can aid the whole world.

But "we must win the peace" and prove to the world that our system is one which will keep people happier and that it is more desirous. Otherwise, with a military victory only, we have not truly won, and the world will not be better off. Without winning the peace, a future revolution may occur which will endanger all of us. Americans must not only point out the way, but lead the way also.

This is called a scientific war, but to me it is not so apparent on the fighting line. It seems not different from any other war except in the magnitude of materials used. As in other wars, whole populations are imbued with the idea that they are fighting for survival or to achieve collectivism in the highest sense of the word. They are moved by emotional appeal.

Every fighting man has his own personal ideal for which he is fighting. Mine is that I love science and it represents my principles of Americanism. My ancestors escaped from Europe not to seek riches, but to gain freedom. This freedom is the very spirit of science and the scientific approach. All great scientists have had this spirit of Americanism or freedom. It was this spirit that lighted the candle of the dark ages. I fight for science, but as a chemist with a sword instead of with a flask in a laboratory.

The logic of science has made the war much clearer to me, and has enabled me to fight better. Values remain relative, keeping me balanced. I am spared the bewilderment of other men as their illusions are shattered in warfare. War has not been disillusioning to me, but in times of stress, I do feel that the gradual decline of our civilization is imminent, and as I gaze upon the stars, I think that only they are constant, and that

a pattern of cyclic behavior governs our civilization.

As in former wars, there is a surge of inventions stimulated by the war. After wars there is too often a depression in science, and those of us who serve on the battle front may have lost our chance to discover, contribute, and invent. But if we are to retain our abilities in the postwar world, we must keep our confidence and our desire to achieve.

The hardships which our fighting chemists are enduring, not the least of which is the postponement of their careers, do not equal the initial disappointments and difficulties of some of our greatest scientists, such as Pasteur or the Curies, before their final successes. We can look forward with courage to the time when we can again achieve.

Social problems are not my concern nor ambition. I am an idealist in that I can conceive of a better world, but a realist in that I actually hope only to help create a compromise world.

In the future, science shall lead the way through the centuries because it is the only endeavor we have so far found to be progressive.

I often wonder if other scientists have the same ideas and reactions that I have in war. An experience of this kind makes me want to get back to my "ivory tower," never to leave it again. As scientists lives are measured by their success in invention and creativeness, so I want mine to be. All that sustains me and gives me a purpose in life is my desire to again breathe the creative fire of achievement in science.

Perhaps my military adventures are benefitting me in some respects. Never before have I been so conscious of natural beauty—the glory of sunsets and sunrise. Formerly I spent my hours in the laboratory oblivious to the natural world and to culture. Only now do I realize that in our scientific world we have little culture. We scientists must patronize art, if civilization is not to conquer us. I should like to contribute to the task of coordinating sciences, culture, and religion.

For the postwar era I advocate a scientific corps of military scientists to preserve peace. They should be under no ordinary army control so far as regulations are concerned for scientists need no regimentation. All scientists should serve in its ranks and as leaders. Such a corps should have been organized to serve in this war as well.

Before the war, I and other chemists could see the beginning of a fierce industrial struggle. Technical strife usually precedes war. When this war ceases, we must be strong in science. It is as difficult in peacetime to stop the technical war as it is to stop rearmament, so as part of the peace terms, let us strip the laboratories of the conquered countries as we shall take away their weapons.

Necrology

H. O. Chute

H. O. Chute, consulting chemical engineer, New York, N. Y., died of bronchial pneumonia on September 18th at the age of seventy-seven.

Mr. Chute was a graduate of George Washington University, Washington, D. C. In 1895 he became superintendent of the Southern Chemical Company, a wood distillation plant at Yuma, Michigan, where until 1907, he constructed plants, and perfected processes in the wood distillation industry. After moving to New York and until his retirement in 1939, Mr. Chute carried on a consulting business with headquarters at The Chemists' Club, New York.

John Fitch King

John Fitch King, F.A.I.C. professor and chairman of the Department of Chemistry of Williams College, of Williamstown, Mass., died August 29, 1944. He was fifty years of age and a native of Youngstown, Ohio.

Dr. King attended Oberlin College and the University of Wisconsin. He received the A. M. degree from Harvard University in 1919 and the Ph. D. degree in 1921 from Johns Hopkins University. He was a Fellow in Chemistry at the University of Munich, Germany, under Professor K. Fajans during the summers of 1928-29.

Dr. King was instructor of chemistry at Johns Hopkins from 1920-21, assistant professor at Williams College from 1921-1925, and associate professor, full professor, and chairman of the Department of Chemistry at Williams College during the past fifteen years.

He specialized in dielectric constants, vaporization of liquid mixtures, electrometric determination of iron in blood, the adsorption of thorium B by thallium halide crystals in the presence of various ions, and was the author of several research publications on these and other subjects. During the first World War he served in the Chemical Warfare Service in the U. S. Army.

He became a member of THE AMERICAN INSTITUTE OF CHEMISTS in 1936.

Walter S. Landis

Walter S. Landis, F.A.I.C., viceresident of the American Cyanamid Company, New York, N. Y., died at his home September 15th, at Old Greenwich, Conn.

Dr. Landis was born in Pottstown, Pennsylvania, in 1881, and received the degrees of Met. C, M. S., and D.

Sc. (Hon), from Lehigh University. In 1906 he studied at Heidelberg, Germany, and in 1909 at Krupp, Aachen, Germany. He taught in the Department of Metallurgy at Lehigh University, resigning the position of associate professor in 1912 when he became associated with the American Cyanamid Company, with which he held the positions of chief technologist, director, and vice-president until his death.

Dr. Landis established the first research laboratory of the Cyanamid Company, and developed processes and plants for the production of derivatives of cyanamide, including the first American plant for the production of ammonia from cyanamide during World War One. He also devised processes for the production of cyanides and ferrocyanides, dicyandiamid, urea, and hydrocyanic acid. He was also designer of the first portable hydrogen generator used by American forces in World War One, and was the first to produce argon in this country on a commercial scale. He held many patents and was the author of numerous publications in the field of development work on nitrogen derivatives.

Dr. Landis became a member of THE AMERICAN INSTITUTE OF CHEMISTS in 1942, and in 1943 was awarded the Gold Medal of the INSTITUTE at its annual meeting held in Chicago.

John T. Norton, Jr.

Dr. John T. Norton, Jr., chief chemist at Allegheny Ludlum Steel Corporation, Watervliet, New York, died in October, 1943.. He was sixty-five years of age. Dr. Norton was born of American parents in London, England.

He received the A. B. degree from Yale University, in 1898, followed by the Ph. D. degree in 1901.

He was a member of Phi Beta Kappa, Sigma Xi, the American Chemical Society, and the American Society for Metals. He became a member of THE AMERICAN INSTITUTE OF CHEMISTS in 1937.

Dr. Frank J. Tone, pioneer in developing abrasives and refractories and originator of the first commercial process for the production of silicon metal, died July 26, 1944, at Niagara Falls, New York, at the age of seventy-five.

Dr. Tone was chairman of the board of directors of the Carborundum Company, where he began work as a chemist in 1895, several years after he was graduated from Cornell.

He is survived by his wife, the former Gertrude Franchot, and by two sons, Frank J. Tone, Jr., a vice-president of Carborundum, and Franchot Tone, stage and screen actor.

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September Meeting

A MEETING of the National Council of The American Institute of Chemists was held on Sunday, September 10th, 1944, at the Hotel Pennsylvania, New York, N. Y., Room 127, at 6:30 p. m. with president Gustav Egloff presiding.

The following officers and councilors were present:

Messrs: G. Egloff, H. L. Fisher, F. A. Hessel, W. H. Hill, D. B. Keyes, R. E. Kirk, H. A. Levey, J. M. McIlvain, R. J. Moore, H. S. Neiman, D. Price, F. D. Snell, A. L. Taylor, M. Toch, W. D. Turner, A. H. Warth, and J. H. Yoe. Dr. E. R. Allen, Mr. M. R. Bhagwat, Dr. M. L. Crossloy, Dr. E. L. Luaces, and Miss V. F. Kimball were present.

The minutes of the previous meeting were approved. The treasurer's report was presented and accepted.

Correspondence with Torsten Hasselstrom regarding a suggested form of chemist's contract was presented. A tentative form of contract had been

considered by the Institute several years ago but not formally adopted. The American Chemical Society also made a report concerning this subject. The Committee on Contracts of the Instiute has collected a number of contracts used in industry. It was suggested that the Institute determine what the rights of the employer and the employee are with regard to contracts and have them studied by a competent lawyer.

Upon motion made and seconded, the president was requested to appoint a committee of three members to study the question of the legal basis for chemists' contracts and in consultation with a good contract attorney to formulate this, and to report back to the Council for Council approval.

Upon motion made and seconded, it was decided that after this report has been submitted and passed upon favorably by the Council, it be sent out for trial reactions from various groups before it is finally adopted by the Council.

Dr. M. L. Crossley was appointed chairman of the Committee on Professional Education, with the request that he add the names of the members of his choice to work on this committee with him.

Dr. Foster D. Snell was appointed chairman of the Committee on Economic Welfare.

A letter from the Committee on Honorary Members was read and upon motion made and seconded, Dr. Maximilian Toch was elected to honorary membership in the Institute.

Dr. Egloff presented a letter which he had written to Institute members urging them to bring in new members, and upon motion made and seconded, the secretary was asked to send this letter to each member, together with a leaflet and application blank.

The Secretary read letters from Miss Minnie A. Graham and J. N. Taylor, thanking the Institute for life membership.

A letter from the secretary of the Pennsylvania Chapter was read, requesting that the territory of the Chapter be defined.

Dr. Luaces reported that Dayton, Columbus, and Cincinnati are included in the Miami Valley Chapter, and that this chapter now has 53 members.

Dr. Hill announced that the Western Pennsylvania Chapter constitution provides for a boundary consisting of the perimeter of a circle with a radius of 75 miles from Pittsburgh, which would not infringe on the territory of those members who can easily reach Philadelphia to attend the Pennsylvania Chapter meetings.

After discussion it was moved and seconded that a committee be appointed to survey the matter of chapter boundaries and to prevent confusion from arising in future cases.

Dr. Moore stated those chapters with small membership were not able

to function properly because the percentage of dues received is not great enough to cover necessary chapter expenses. After discussion, this matter was referred to the Financial Advisory Committee.

Upon motion made and seconded, the following new members were elected.

Fellows

Barkman, Aaron

(1944), *Engineer,* Sherwin Williams Company, 115th & Cottage Grove, Chicago, Ill.

Getz, Charles A.

(1944), *Vice president in Charge of Research,* Cardox Corporation, 307 N. Michigan Ave., Chicago 1, Ill.

Grafton, Corydon M.

(1944), *Director of Research,* Cordo Chemical Corporation, 34 Smith Street, Norwalk, Conn.

Krawetz, John

(1944), *President,* Phoenix Chemical Laboratory, Inc., Shakespeare Avenue, Chicago, Ill.

McGraw, Hugo Richard

(1944), *Industrial Fellow,* Mellon Institute, 4400 Fifth Avenue, Pittsburgh 13, Pa.

Newton, Roy C.

(1944), *Vice president,* Swift & Co., Union Stock Yards, Chicago 9, Ill.

Nydick, Abraham J.

(1944), 233 Broadway, New York, N.Y.

Podbielniak, Walter J.

(1944), Podbielniak Centrifugal Super-Contractor Co., Chicago, Ill.

Renfrew, Alice G.

(1944), *Fellow,* Mellon Institute, Pittsburgh, Penn.

Riegel, Emil R.

(1944), *Professor of Chemistry,* University of Buffalo, Buffalo 14, N. Y.

Schroder, Arthur

(1944), *Chemical Analyst,* Alien Property Custodian, 135 South La Salle St., Chicago 3, Ill.

Shnidman, Louis

(1944), *Laboratory Director and Chief Chemist,* Rochester Gas & Electric Corp., 89 East Avenue, Rochester, N. Y.

Members

Arnoff, Albert I.

(M.1944), *President and General Manager,* Massachusetts By-Products Company, 53 State Street, Boston, Mass.

Heinze, Marvin C.

(M.1944), *Assistant Plant Engineer,* Westvaco Chlorine Products Corp., 500 Roosevelt Ave., Cateret, N. J.

Lodder, William B.

(M.1944), *Chemist,* Diamond Alkali Company, Painesville, Ohio.

Neill, William J.

(M.1944), *Director of Research,* Columbus Metal Products Co., Inc., Columbus 8, Ohio.

Associate

Wilson, Dorothea Theresa

(A.1944), 353 Tioga Street, Trenton 9, New Jersey.

Upon motion made and seconded, William N. Morris was raised from Member to Fellow.

There being no further business, adjournment was taken.

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Universal Oil Products Company
Riverside, Illinois
Council Representative, Gene Abson

Los Angeles

Chairman, R. J. Abernethy

Secretary-treasurer, Imo Baughman Simpson
638 N. Kenmore Avenue
Los Angeles, California

THE August meeting was held on the 17th at Cliftons' Cafeteria, Los Angeles at 6:30 p.m. Mr. Abernethy was in the chair and Mr. Henderson acted as secretary. Election of officers was decided for the September meeting. Abernethy discussed the basis of membership and the qualifications of a national executive secretary.

Salathe stated we are not a competitive group and suggested joint meetings with the American Chemical Society and other technical societies. He further stated it to be our function to teach and to educate chemists in professionalism. Abernethy thought personal acquaintance was important in obtaining new members. Greenhood told of his experience and talks in securing members.

In subsequent meetings it is expected we shall have as speakers a patent attorney, an organization man, and chemists. Salathe urged more publicity for our meetings.

Louisiana

Chairman, D. F. J. Lynch *Vice-chairman,* C. S. Williamson, Jr.
Secretary-treasurer, J. David Reid
Southern Regional Research Laboratory
2100 Robert E. Lee Boulevard
New Orleans 19, Louisiana
Council Representative, Harold A. Levey
News Reporter to THE CHEMIST, Helen M. Robinson

Miami Valley

Chairman, E. L. Luaces *Vice-chairman,* J. M. Purdy
Secretary-treasurer, John R. Fisher, Jr.
Chemical Developments Corporation
314 W. 1st Street, Dayton 2, Ohio
Council Representative, Harvey G. Kittredge

New York

Chairman, M. L. Hamlin *Vice-chairman,* Charles N. Frey
Secretary-treasurer, Lloyd W. Davis
E. F. Drew & Company
416 Division Street, Boonton, New Jersey
Council Representative, A. Lloyd Taylor

A testimonial dinner in honor of Dr. Maximilian Toch will be held on Friday, October 27th, at the Building Trades Employers' Association Clubrooms, No. 2 Park Avenue, New York, N. Y. at seven o'clock.

Speakers will include George Baekeland, president of the Bakelite Corporation, Dr. Marston T. Bogert, professor emeritus of Columbia University, and Dr. Gustav Egloff, president of the Institute.

Dr. Toch will be presented with an honorary membership in the AMERICAN INSTITUTE OF CHEMISTS at this meeting, in recognition of his many years of service to the Institute, as a charter member, as its president during 1936 to 1938, and as chairman and member of various committees.

John J. Miskel, National Oil Products Company, Harrison, N. J. is in charge of reservations for the dinner.

Niagara

Chairman, M. R. Bhagwat *Vice-chairman,* Frederick L. Koethen

Secretary-treasurer, Frederick L. Sievenpiper
National Aniline Division
Allied Chemical and Dye Corp.
Buffalo, New York

Council Representative, Arthur W. Burwell
Alternate, Alvin F. Shepard
Reporter to THE CHEMIST, John E. Seubert

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23 Bala Avenue
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Secretary, Ernest J. Umberger
207 Albany Avenue, Takoma Park, Maryland
News Reporter to THE CHEMIST, S. W. Griffin
Council Representative, T. H. Tremearne

Western Pennsylvania

President, Henry G. Goodman, Jr. *Vice-president,* Henry F. Smyth, Jr.

Secretary-treasurer, Jacqueline S. Front
Mellon Institute of Industrial Research
Pittsburgh 13, Pennsylvania
Council Representative, William H. Hill

More Money for Medical Research

Theodore G. Klumpp, president of the Winthrop Chemical Company, Inc., in a talk at the recent convention of the American Chemical Society, recommended that more time and money be devoted to research in medical sciences. Dr. Klumpp asserted that the normal life span of man should be from 125 to 150 years, based on the life span of other animals which is five to six times longer than the period of maturation. Far more money is devoted to research in plastics, metallurgy, etc. than is given to research on the factors which reduce the longevity of man. Dr. Klumpp hopes that the future scientists will devote more efforts to this important field.

National Chemical Laboratory For India

The Council of Scientific and Industrial Research at Delhi, India, is making plans to establish, after the war, a National Chemical Laboratory in India. Emphasis will be laid on industrial research and pilot plant developments of new processes.

Komarewsky Chosen President

V. I. Komarewsky F.A.I.C. research professor of chemistry at Illinois Institute of Technology, was elected president of the chapter of the Sigma Xi at Illinois Institute of Technology.

War Contract Settlements Speeded

A system of partial payment of war contract termination claims has been announced by Robert H. Hinckley, director of the Office of Contract Settlement.

A prime contractor or subcontractor whose war contract has been canceled may file application immediately for partial payment of his costs incurred which are allocatable to the terminated portion of the contract. A partial payment of 75 to 90 per cent of estimated costs will be made within thirty days.

Fanning Feted By Malmstrom

In celebration of his twenty-fifth anniversary with N. I. Malmstrom & Company, a dinner was tendered to Frank G. Fanning by Mr. Malmstrom at New York's Stockholm Restaurant on September seventh. Mr. Fanning, who joined the firm at office boy age, is now partner and sales manager of that company. He is also president of the Salesmen's Association of the American Chemical Industry. Attending the dinner were many friends in the drug, chemical, and allied industries.

Albright Appointed Vice President

Douglas C. Albright has been appointed vice president and assistant to the president of The National Tool Company, Cleveland, Ohio.

For Your Library

THE CHEMISTRY OF CELLULOSE. By Emil Heuser, *John Wiley and Sons*, 1944. 660 pp. 6" x 8¾". $7.50

This volume is a compendium and digest of the literature of the chemistry of cellulose with attention to the microscopic and sub-microscopic structure of the cellulose fiber. Emphasis is on the scientific and theoretical side rather than on the practical applications of cellulose chemistry, and it will be particularly useful to the student or to those in practical cellulose chemistry who wish further to systematize their knowledge.

SYNTHETIC RESINS AND RUBBERS, By Paul O. Powers. *John Wiley and Sons*, 1943. 296 pp. 5¾" x 8½". $3.00.

This book is a compilation of material on the chemistry of synthetic resins and rubbers of commercial importance. Much of its content has been used in ESMDT and ESMWT courses in plastics given at Franklin and Marshall College.

The book contains theories of polymer formation, condensation, polymers, vinyl polymers, synthetic rubbers, resins from natural products, and the application of synthetic resins. This is a general survey of technical information on polymers.

PRINCIPLES AND APPLICATIONS OF ELECTROCHEMISTRY. Vol. 1 "Principles" H. Germain Creighton. Vol. II "Applications" W. A. Koehler. *John Wiley & Sons*. Vol. I 477 pp. 5¾" x 8½". $5.00. Vol. II 573 pp. 5¾" x 8½". $5.00.

The first volume of principles by H. G. Creighton adds to a systematic general treatment, further data on fused salts, electrophoresis, polarigraphic analysis, electrolytic oxidation and glow discharge electrolysis. The second volume by W. A. Koehler brings together the general facts on practical electrochemistry with the newer work on continuous tin and zinc strip plating, magnesium, hydrogen peroxide, a short description of induction heating for plywood manufacture, the newer carbon bisulfide furnace, and fluorescent lamps. More detail would be desirable.

—John A. Steffens, F.A.I.C.

New Journal on Psychology

A new quarterly, entitled *Journal of Clinical Psychology*, will appear in January 1945. It will be limited to the publication of original research and theoretical articles in the field of clinical psychology. Editorial offices will be at the Medical College Building, University of Vermont, Burlington.

LOBSCOWS. By Ivor Griffith, Ph.M., Sc.D., F.R.S.A., F.A.I.C. (President, Philadelphia College of Pharmacy and Science). *International Printing Company,* Philadelphia. 1939.

It is not often that one reviews a book five years after it has been published. But *Lobscows* is an unusual book and therefore deserves unusual treatment. In the opinion of this writer, it is just as timely today as it was when it was written. And so, while this belated review may call for an explanation, it does not call for a defense.

To those who know what *Lobscows* means, the title will appear quite appropriate. For like the Welsh dish, *Lobscows,* which is made of kitchen scraps of every kind, this book contains many widely diversified ingredients. Dr. Griffith writes entertainingly of Pasteur, of baldness, of unnecessary noises, and of blood, of book reviewing, country doctors, syphilis, and Roquefort cheese. Name your favorite subject, and the chances are you will find it discussed somewhere between the covers of this volume.

Did you know that blondes have 140,000 to 180,000 hairs and redheads only 50,000? That King James forbade the use of tobacco in England? That the word "poison" has its roots in the Latin "potio," meaning "to drink?" That the death rate from typhoid fever in Philadelphia dropped from 61/100,000 to 1/100,000 between 1907 to 1939? That Al-Kohl in Arabia was not alcohol but a finely powdered resin used to enhance the beauty of Egyptian eyes?

Cinderella's lovely slipper, we learn, was not made of glass, after all. When the story of this immortal maiden found its way from the Orient to France, a sleepy printer, reading *pantoufle en vair* (a slipper of fur), set the type to read *en verre,* which means glass. The first crude oil found at Tarentum, Penna., was sold as a remedy for all kinds of diseases at fifty cents a pint. And the first pot of tea was the result of a mandarin's efforts to hide the mawkish taste of Yangtze River water.

When animals lick their wounds, their action has sound bacteriological justification, according to a German scientist. Cultures of bacteria to which animal saliva was added, failed to thrive, while untreated control cultures grew flourishing colonies of germs. Afflicted animals, as Dr. Griffith aptly remarks, use salivation for salvation.

The book abounds in homey philosophy and witty remarks. When someone asked Dr. Griffith how many students he had in his classes, he replied, "about twenty per cent." Of Van Leeuwenhoek, the Dutch lens maker, he says that "his daily grind was a joy, and his daily joy was a grind." Then, turning serious again, our author regrets that the inventor of the

microscope, in his native city of Delft, is only remembered by a simple stone, while a general in the Dutch army, long since forgotten, had a flowering monument erected to him.

To the question why the present century has produced no such great chemists as Perkin, Lavoisier, Liebig, and Scheele, the author answers in Meredith's poetic lines.

"The age is gone o'er
When a man may in all things be all
... Our own
Is too vast, and too complex, for one man alone . . .
. . . There were giants in those irreclaimable days;
But in these days of ours
In dividing the work, we distribute the powers . . . "

Somewhat faulty copy-editing must be held responsible for various repetitious statements. But this blemish and a few others of a minor nature are not sufficient to spoil the relish with which you will read through this book and probably put it on the lowest shelf in your library so you can reach it easily for re-reading at frequent intervals.

—Otto Eisenschiml, F.A.I.C.

Elementary Qualitative Analysis. Bruce E. Hartsuch, pp. viii, 274 (7.75" x 10.5") loose-leaf, paper covers. John Wiley & Sons, Inc.. Price $2.50.

This book is intended for students of elementary university chemistry. The text is well written, yet places too much stress upon the purely physico-chemical aspects to impress upon the student all of the theoretical foundations of qualitative analysis. As in texts by other authors, the theoretical data is carried to extremes when we consider the type of student the author wishes his text to serve.

Text material in this book is divided into five major categories, i.e. (1) Theoretical Foundation, (2) Cations, (3) Anions, (4) Interfering Substances, and (5) Miscellaneous Tables. Ruled pages are included throughout the text for the insertion of written notes so that this book may also serve as a laboratory manual.

There are 121 pages devoted to miscellaneous physico-chemical discussions; each topic is concluded by mathematical derivations, in spite of the fact that the book is to provide an elementary approach to the subject. Among the seemingly superfluous topics included as the basis of elementary analytical technic, there are discussions of the structure of matter, electric cells and batteries, Ostwald's dilution law, complex ions and Werner's theory, etc., which do indeed provide a heroic dose for the type of student for whom the book is intended.

The binding of this book is hardly adequate to withstand the rough usage imposed by its double purpose as

text and manual. It might have been expedient to perforate the pages to standard gauge so as to permit their insertion into rigid, serviceable covers commonly used as loose-leaf binders.

SEMIMICRO QUALITATIVE ANALYSIS by W. L. Evans, A. B. Garrett, & L. L. Quill, all associated with The Ohio State University, pp. vii, 246 (7.75" x 10.5") loose leaf, paper covers. Illustrated and one colored chart. Price $2.00.

The classical macro-methods of qualitative analysis are here translated into terms of microchemical technic which is now an important aspect of analytical chemistry.

This well prepared text presents its subject in an interesting manner. While intended as a text and laboratory manual in primary chemical technic, this book includes an excess of data, mainly irrelevant, from the standpoint of the student beginning a university course in chemistry. The physico-chemical approach to qualitative analysis is stressed throughout, and yet the introductory or fundamental data have been relegated to a later portion of the book. The fallacy of this arrangement is at once evident when, for example, the text on page 16 specifies the use of 6 n HC1, or on page 17, the use of 0.3 n HC1, while the definition of standard solutions is not stated until we come to page 160.

The text describes the microtechnic, apparatus and qualitative reagents, then proceeds to the actual methods of testing for anions and cations. Ruled pages and ample spaces are available for the insertion of written laboratory notes. There are no references to the use of specific organic reagents for the confirmation of substances sought in the course of tests. The inclusion of material of this sort would have served a better purpose than the overemphasis that is placed upon fundamental theories in a text of this type. The loose-leaf make-up of this book, enclosed as it is in paper covers, is hardly adequate to withstand rigorous usage as both text and laboratory manual.

—Simon Mendelsohn, F.A.I.C.

The Hexagon, publication of Alpha Chi Sigma, professional chemical fraternity, carries an article in its September issue on "Employment and Professional Standards," a compilation of suggested plans of the various groups of Alpha Chi Sigma for creating a bureau to handle employment and professional standards within the fraternity.

Chemical Publishing Company, Brooklyn, New York, announces the publication of a cumulative index covering the six volumes of "The Chemical Formulary." The index sells for $4.00.

Steel Industry Views Future

The annual war output of the steel industry is estimated, according to *Blueprints of the Future* at 94,000,000 tons, while the postwar demand will not exceed 65,000,000 to 70,000,000 tons per year, but conversion to peacetime production will involve few problems and in competition with the other metals, the steel industry will have in its favor an abundance of raw materials, favorable selling prices, and the permanency of its product.

THE CHEMIST,
New York City, N. Y.

Gentlemen:—

There was noted in the daily papers sometime ago a paragraph about a liquid that was used by refugees and escaped prisoners in Europe, whereby the person of these individuals could be sprayed with a liquid that destroyed all body odors and made it impossible for bloodhounds and dogs to trace them. It was quoted as a secret formula that was used for this particular purpose.

We wrote to the New York Times, asking them if they had any record of this story. We also communicated with the United Press and Associated Press, both of whom said the same thing, namely they *recalled such a tale,* but had no way of locating the source or even the time when it was published.

Have been working on a similar product, which would destroy the scent of the human body. We have been able to do this with the Skunk odor, which is far more powerful than any of the human aromas we have personally experienced. We have also been able to eliminate organic odors of different kinds, through neutralizing actions of certain chemicals.

Did you ever publish anything on this subject? Can you give us any data or suggestions, which from your experience would help in solving this matter?

CHARLES V. SPARHAWK.

Editor's Note: Can any of our readers assist us to answer this inquiry?

Crossley Awarded Honorary Degree

M. L. Crossley, F.A.I.C., director of research of the American Cyanamid Company, was awarded the honorary doctor of science degree by Brown University, at its recent commencement exercises.

Meeting Dates

Oct. 12-14 American Association of Textile Chemists and Colorists, Atlantic City, New Jersey.

Oct. 19. Baltimore Chapter, THE AMERICAN INSTITUTE OF CHEMISTS, Loyola College, Baltimore. Speaker, Dr. Harry L. Fisher, director of organic research, U. S. Industrial Chemicals, Inc., "Origin and Development of Synthetic Rubbers."

Oct. 25-27. American Oil Chemists' Society, Annual Fall Meeting. LaSalle Hotel, Chicago, Illinois.

Oct. 27. New York Chapter Meeting of THE AMERICAN INSTITUTE OF CHEMISTS. Testimonial Dinner in honor of Dr. Maximilian Toch. 26th floor of No. 2 Park Ave., 6:30 o'clock.

Oct. 27. Meeting of the National Council of THE AMERICAN INSTITUTE OF CHEMISTS. 26th floor No. 2 Park Ave. 4:00 p. m.

Nov. 15-19 National Industrial Chemical Conference and National Chemical Exposition, Coliseum, Chicago, Ill.

Nov. 16. Meeting Baltimore Chapter. THE AMERICAN INSTITUTE OF CHEMISTS.

Nov. 17. Technical Meeting, American Association of Textile Chemists and Colorists, New York Section.

Dec. 1. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS 26th Floor. No. 2 Park Avenue, New York, N. Y.

Dec. 8. Meeting, Baltimore Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

Jan. 12, 1945. Technical Meeting, American Association of Textile Chemists and Colorists, New York Section.

Jan. 18. Meeting, Baltimore Chapter, THE AMERICAN INSTITUTE OF CHEMISTS.

Jan. 26. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS 26th Floor. No. 2 Park Avenue, New York, N. Y.

March 16. Technical Meeting, American Association of Textile Chemists and Colorists, New York Section.

Mar. 23. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS 26th Floor. No. 2 Park Avenue, New York, N. Y.

Apr. 27. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS. Student Medal Presentation, 26th Floor, No. 2 Park Avenue, New York, N. Y.

May 18. Technical Meeting, American Association of Textile Chemists and Colorists, New York Section.

May 25. New York Chapter of THE AMERICAN INSTITUTE OF CHEMISTS. Annual Business Meeting, 26th Floor, No. 2 Park Avenue, New York, N. Y.

Hercules Opens New Sales Office

A new sales office has been opened in the Union Commerce Building, Cleveland, Ohio, for the Synthetics Department of Hercules Powder Company. W. Wallace Trowell will be manager of the new office, and John L. Present, technical representative.

Gustav Egloff, president of THE AMERICAN INSTITUTE OF CHEMISTS has been elected a director of the Chicago Technical Societies Council, which represents forty scientific and technical organizations in the Chicago area with a membership of 15,000.

Henri Coutinho, **F.A.I.C.**, president of Perfumers' Manufacturing Corporation, New York, N. Y. presented a paper on "Molecular Constitution and Bromo-Acid Solubility" before the recent annual convention of the Toilet Goods Association, Inc.

An Inter-American Institute of Agricultural Sciences has been established to encourage and advance the development of agricultural sciences in the American republics through research and teaching activities, and has been approved by the United States Senate.

The Four Enemies of Mankind

Dr. Harlow Shapley, director of the Harvard Observatory, speaking at the Annual Meeting of the American Association for the Advancement of Science, stated that scientists must find out how to overcome the four major enemies of mankind. These are the tyranny of the unknown, illiteracy, premature senility, and the threat of the deadening uniformity of culture.

On the tyranny of the unknown, Dr. Shapley said "We are still embedded in abysmal ignorance of the world in which we live. We have advanced very little, relative to the total surmisable extent of knowledge, beyond the level of wisdom acquired by animals of long racial experience."

Lawrence W. Bass, F.A.I.C., director of the New England Industrial Research Foundation, Boston, Mass. is now associate director of chemical research jointly for the United States Industrial Chemicals, Inc. and the Air Reduction Company, Inc.

ADVERTISING INDEX

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc. REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, and MARCH 3, 1933

Of THE CHEMIST, published monthly except June, July, and August at New York, N. Y., for October 1, 1944.

STATE OF NEW YORK } ss.
COUNTY OF NEW YORK }

Before me, a Notary Public in and for the State and country aforesaid, personally appeared Vera F. Kimball, editor, who, having been duly sworn according to law, deposes and says that she is the Editor of THE CHEMIST and that the following is, to the best of her knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Name of	Post Office Address
Publisher: THE AMERICAN INSTITUTE OF CHEMISTS,	60 E. 42nd Street, New York 17, N. Y.
Editor: Vera F. Kimball,	60 E. 42nd Street, New York 17, N. Y.
Managing Editor: T. S. McCarthy,	59 John St., New York, N. Y.
Business Manager:	None

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given).

THE AMERICAN INSTITUTE OF CHEMISTS, INC., 233 Broadway, New York, N. Y.

(Non-profit making corporation. No stockholders.)

Gustav Egloff, President, Universal Oil Products Company, Chicago, Illinois.

Donald Price, Vice-president, Interchemical Corp., New York 19, N. Y.

Frederick A. Hessel, Treasurer, 4 Cherry Street, Montclair, N. J.

Howard S. Neiman, Secretary, 233 Broadway, New York, N. Y.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) NONE.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appear upon the books of the company but also, or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by her.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is——. (This information is required from daily publications only.)

Vera F. Kimball
(Signature of Editor)

Sworn to and subscribed before me this first day of October, 1944.
Juel Kelly, Notary Public
(My commission expires March 30, 1945)).

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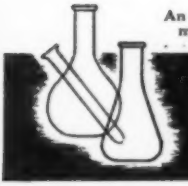

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